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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/679,097	10/04/2000	Tsutomu Yamada	YKI-0058	9653

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EXAMINER	
JORGENSEN, LELAND R	
ART UNIT	**PAPER NUMBER**
2675	

DATE MAILED: 02/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/679,097	YAMADA, TSUTOMU	
	Examiner	Art Unit	
	Leland R. Jorgensen	2675	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 August 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *11/12/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1, 2 and 10 – 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tang et al., USPN 5,684,365, in view of Ukai, USPN 4,810,060.

Claim 1

Tang teaches a color display device in which display pixels for indicating different colors are provided in plural numbers for each color and arranged in a matrix. Tang, col. 1lines 16 – 19. The color display device comprising, corresponding to each display pixel, a self-emissive element [EL element] for emitting light of a predetermined color; a driving thin film transistor (TFT) [power TFT (T2)] having a first end in electrical communication with the self-emissive element for supplying a drive current to the self-emissive element, and a second end in electrical communication with a power source with a constant voltage; and a switching TFT [logic TFT (T1)] having a first end in electrical communication with a data line (source line) and a second end in electrical communication with a gate of the driving TFT, the switching TFT controls whether a data signal from the data line is supplied to the gate of the driving TFT. Tang, col. 4, lines 14 – 55; col. 6, lines 9 – 20; and figure 1. Tang also teaches, "Since both the organic EL pad and the cathode are continuous layers, the pixel resolution is defined only by the feature size of the TFT and the associated display ITO pad and is independent of the organic component or the cathode of the EL cell." Tang, col. 5, lines 18 – 22.

Tang does not specifically teach that the size of the driving TFT in a display pixel for one color is altered from that in a display pixel for another color.

The specification states, "In the present invention, transistor size of a TFT refers to the ratio of the channel width W to the channel length L in the TFT channel, namely, W/L." Specification, page 10, lines 3 – 5. Ukai teaches that the W/L ratio of a power TFT in a display pixel for one color is altered from that in a display pixel for another color. Ukai, col. 3, lines 21 – 50.

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the varying W/L ratio for each color as taught by Ukai with the color display device as taught by Tang to produce a display image of good contrast regardless of the color being displayed. Each thin film transistor has a structure specific to each color to provide substantially the same light transmission-voltage characteristic for each color in the pixel. Ukai, col. 2, lines 44 – 48; col. 39 – 45; and col. 4, lines 47 – 56.

Claim 2

Tang et al. teaches an electroluminescence display that has, corresponding to each display pixel, a switching TFT 1 for controlling turning on and off of a driving TFT 2 and a current there through. Tang et al., col. 6, lines 9 – 20; and figure 1.

Claim 10

Tang et al. teaches that the self-emissive element is an electroluminescence element. Tang et al., col. 1, lines 16 – 19.

Claim 11

Neither Ukai nor Tang et al. specifically state that the size of the driving TFT is altered by changing a gate width according to emitting color while a gate length is fixed.

It would have been obvious to one of ordinary skill in the art at the time of the invention to alter the size of the driving TFT by changing a gate width according to emitting color while a gate length is fixed. Ukai invites such step.

> Such control of the ration W/L of the thin film transistor of each color can easily be effected by selecting the size of a mask which determines the ratio W/L, during the manufacture of the liquid crystal display element.

Ukai, col. 3, lines 46 – 50.

It would have been obvious to one of ordinary skill in the art at the time of the invention to control the ration W/L by fixing the gate length L while changing the gate width W.

Claim 12

For the reasons discussed in the response to claim 11, it would have been obvious to one of ordinary skill in the art at the time of the invention to control the ration W/L by fixing the gate width W while changing the gate length L.

3. Claims 3 – 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ukai in view of Tang et al. as applied to claim 1 above, and further in view of Rumbaugh, USPN 6,072,272.

Claim 3

Ukai teaches varying the size of the driving TFT according to the different light transmission characteristics for each color. Ukai, col. 4, lines 47 – 54; col. 4 and lines 47 – 56.

Neither Ukai nor Tang et al. specifically teach that the different light transmission characteristics for each color is the emissive efficiency of each color self-emissive element.

Rumbaugh teaches display pixels configured to compensate for the emissive efficiency of each color self-emissive element. Rumbaugh, col. 3, lines 33 – 45; and col. 4, lines 39 – 55.

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Rumbaugh with the teachings of Ukai and Tang et al. to produce a display wherein the size of the driving TFT is determined according to an emissive efficiency of a self-emissive element connected to the driving TFT. Rumbaugh teaches the need to adjust the each pixel according to the emission efficiency of peach self-emissive element.

> In forming subpixels to have a surface area and position determined by the light emission efficiency of the particular phosphor, the invention provides a display having improved color performance.

Rumbaugh, col. 3, lines 25 – 29. Rumbaugh adds,

> To further enhance color performance, the area ratios of the red, green, and blue subpixels can be adjusted depending upon the particular phosphor, and the desired white color coordinate. In particular, the blue subpixels arrayed on the anode of a display formed in accordance with the invention have a larger surface area than either the red subpixels or the green subpixels. Additionally, the red subpixels have a greater surface area on the anode than the green subpixels. Accordingly, anodes fabricated in accordance with the invention contain a plurality of subpixels, in which the surface area of each blue subpixel in greater than the surface area of each red subpixel, and the surface area of each red subpixel is greater than the surface area of each green subpixel.

Rumbaugh, col. 3, lines 33 - 49. Although Rumbaugh teaches an relationship between the size of the pixel area and the size of the emissive efficiency, the logic would equally apply to the size of the driving TFT and the emissive efficiency.

Claim 4

Rumbaugh teaches that emissive area of a pixel having a high emissive efficiency is set smaller compared to the emissive area of a pixel connected to a self-emissive element having a low emissive efficiency. Rumbaugh, col. 4, lines 51 – 55.

Claim 5

Rumbaugh teaches that emissive area of a pixel having a high emissive efficiency is set smaller compared to the emissive area of a pixel connected to a self-emissive element having a low emissive efficiency. Rumbaugh, col. 4, lines 51 – 55.

Claim 6

Rumbaugh teaches that green has the highest emission efficiency. Rumbaugh, col. 3, lines 4 – 6; and col. 4, lines 49 – 51.

Claim 7

Rumbaugh teaches that emissive area of a pixel having a lowest emissive efficiency is set larger compared to the emissive area of a pixel connected to a self-emissive element having a high emissive efficiency. Rumbaugh, col. 4, lines 51 – 55.

Claim 8

Rumbaugh teaches that blue has the lowest emission efficiency and red has a lower emission efficiency than green. Rumbaugh, col. 4, lines 51 – 55.

Claim 9

Rumbaugh teaches that emissive area of a pixel is made successively larger as the emissive efficiency decreases. Rumbaugh, col. 4, lines 51 – 55.

4. Claims 13 - 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ukai and Tang et al. in view of Rumbaugh as applied to claims 1 and 3 above, and further in view of Codama et al., USPN 6,121,726.

Claim 13

Ukai, Tang et al., and Rumbaugh teach a color display device. As discussed in the rejection to claim 1, Ukai and Tang et al. teach a self-emissive element for emitting light of a predetermined color and a driving thin film transistor (TFT) connected to the self-emissive element for supplying a drive current to the self-emissive element. As discussed in the rejections to claim 1 and claim 3, Ukai and Tang et al. in view of Rumbaugh teaches that size of the driving TFT in a display pixel for one color is set for every color in accordance with the emission efficiency of the emissive element disposed at the display pixel.

Rumbaugh teaches "To further enhance color performance, the area ratios of the red, green, and blue subpixels can be adjusted depending upon the particular phosphor, and the desired white color coordinate." Rumbaugh, col. 4, line 57 – col.5, line 8.

Neither Ukai, Tang et al., nor Rumbaugh specifically teach the chromaticity of each color emitted by respective emissive element and the chromaticity of target display white of the display device.

Codama teaches the chromaticity of each color emitted by respective emissive element and the chromaticity of target display white of the display device. Codama, col. 3, lines 5 – 10.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use chromaticity as taught by Codama with the color adjusted display of Ukai, Tang et al., and Rumbaugh to produce a display with pixels adjust both for the emission efficiency of each

emissive element and for the chromaticity of each color emitted by each emissive element and the chromaticity of target display white of the display device. Codama teaches,

> [I]t is preferable to regulate the respective layers in conformity to chromaticity coordinates according to the NTSC standard or the current CRT standard. Such chromaticity coordinates may be determined by use of general chromaticity coordinates measuring equipment, for instance, BM-7 or SR-1 made by Topcon Co., Ltd.

Codama, col. 3, lines 5 – 10. By regulating the pixels according to the chromaticity coordinates, the display would be most pleasant to the human eye.

Claim 14

Rumbaugh teaches that the size of emissive area of a pixel of any one color, among the display pixel of various colors, is different from the size emissive area of the display pixel of another color. Rumbaugh, col. 4, lines 51 – 55.

Claims 15 and 18

Codama teaches that the emissive element is an organic electroluminescence element comprising the emissive layer using an organic compound. Codama, col. 1, lines 10 – 14.

Claim 16

As discussed in the rejection to claim 1, Ukai and Tang et al. teach a self-emissive element for emitting light of a predetermined color and a driving thin film transistor (TFT) connected to the self-emissive element for supplying a drive current to the self-emissive element. As discussed in the rejections to claim 1 and claim 3, Ukai and Tang et al. in view of Rumbaugh teaches that size of the driving TFT in a display pixel for one color is set for every color in accordance with the emission efficiency of the emissive element disposed at the display pixel.

As discussed in the rejections to claim 13 and 14, Ukai, Tang et al., and Rumbaugh, in view of Codama, teach that size of the driving TFT in a display pixel for red, for green, and for blue is set on the basis of the emission efficiency of the emissive element of each display pixel and a luminance ratio of red to green to blue in accordance with each chromaticity of red, green, and blue emitted by respective emissive element of the display pixel, and with the chromaticity of target display white of the display device.

Claim 17

Rumbaugh teaches adds that the emissive area of the display pixel of any one color among the display pixel for red, for green, and for blue is different in size from the emissive area of the display pixel of another color. Rumbaugh, col. 4, lines 51 – 55.

Response to Arguments

5. Applicant's arguments filed 26 August 2004 have been fully considered but they are not persuasive.

Independent claims 1, 13, and 16 each teach a two part invention. First, each claim describes a switching TFT and a driving TFT. The driving TFT provides a drive current to an self-emissive element. Tang teaches such a circuit. Second, each claim teaches varying the size of the driving TFT according to the color emitted by the self-emissive element. Thus, the TFT that provides the drive current to the green element would have a different size than the TFT that provides the drive current to the red element. By varying the size of the TFT, each TFT may provide an optimal current for each color. Examiner has not found prior art that teaches varying the size of the TFT providing a drive current to a self emissive element. Examiner, however, has

found prior art that teaches varying the size of a TFT to provide a drive current to charge up a liquid crystal pixel element. In addition to Ukai cited above, Steffensmeier, USPN 5,798,745, and Nomoto, JP 03153219 A, each teaches varying the size of the TFT to provide an optimal drive current to a liquid crystal element.

The critical issue in this case is would it have been obvious to one of ordinary skill in the art at the time of the invention to use the prior art teaching of varying the size of a TFT to provide a drive current to a liquid crystal pixel element to a self emissive element? It is well know in the art to apply the teachings about a TFT for driving liquid crystal element to a TFT for driving a self-emissive element. See e.g. Sasaki et al., USPN 5,818,068, col. 14, lines 42 – 53, col. 21, lines 11 - 24; Yamazaki et al., USPN 5,888,858, col. 11, lines 21 – 25; Sano et al., USPN 6,252,248 B1, col. 8, lines 20 – 44; and Sano et al., USPN 6,628,363 B1, col. 10, lines 9 – 25.

Examiner find unpersuasive applicant's argument that the TFT taught by Ukai is a switching TFT, not a driving TFT. Both the TFT in the claims and the TFT in Ukai serve the same function of, in response to a signal at the gate, providing a current to the pixel element. Thus, whether the prior art labels the TFT the drive TFT, the switching TFT, the pixel TFT or any other name is immaterial. The basic function is the same.

Applicant also argues that the liquid crystal element's response to the drive current from the TFT taught by Ukai and the other cited art is different than the response of the self emissive element to the drive current. A self emissive element response directly to the drive current. When the drive current is off, the self emissive element is off. As the drive current increases, the brightness of the self-emissive element increases. In a liquid crystal elements, however, the

drive current charges up the capacitances on a liquid crystal element, as shown in Ukai figure 6. The voltage difference between the substrates of the liquid crystal element that changes the polarization of the liquid crystal to allow a light to pass through the element. Nevertheless, the critical observation of Ukai is that the drive current provided by the TFT differs as the size of the TFT differs and that different color pixel elements respond differently to different drive currents. By varying the size of the TFT, one could optimize the drive current for each different color pixel. In fact, the relationship between the size of the TFT and the brightness of the pixel element is more obvious for a self-emissive element than for a liquid crystal element. Thus, one in the art, knowing the teachings of Ukai, would readily apply Ukai teachings to the self-emissive element.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leland R. Jorgensen whose telephone number is 703-305-2650 (or at 571-272-7768 after March 2005). The examiner can normally be reached on Monday through Friday, 10:00 am through 6:00 pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Razavi can be reached on 703-305-4713. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

lrj

DENNIS-DOON CHOW
PRIMARY EXAMINER